REMARKS

By this Amendment, Applicant has amended the specification and drawings, canceled claim 3 without prejudice or disclaimer, and amended claims 1, 4, 5, and 14. No new matter has been added.

In the Office Action, the Examiner objected to the drawings; rejected claims 1, 2, and 6-15 under 35 U.S.C. § 103(a) as being unpatentable over "Admitted Prior Art (Fig. 9, pages 1-2)" in view of Mabuchi et al. (U.S. Patent No. 5,645,644); rejected claims 3-5 under 35 U.S.C. § 103(a) as being unpatentable over "Admitted Prior Art (Fig. 9, pages 1-2)" in view of Mabuchi et al. and Kanai et al. (U.S. Patent No. 5,914,051).

The Examiner objected to the drawings "because they do not include . . . reference sign(s) . . . '30' [mentioned] on page 6, line 22 [of the specification]," and "because reference character '96' has been used to designate both 'supporting step' in Fig. 2 and 'planar antenna member' in Fig. 3." Office Action at 2. Applicant has added reference character "30" to Fig. 1 and has followed the Examiner's helpful suggestion to substitute reference character "76" for reference character "96" in Fig. 3, as set forth in the Amendments to the Drawings section in this Amendment. Therefore, Applicant respectfully requests reconsideration and withdrawal of the objection to the drawings.

The Examiner rejected claims 1, 2, and 6-15 under 35 U.S.C. § 103(a) as being unpatentable over "Admitted Prior Art (Fig. 9, pages 1-2)" (hereinafter "admitted prior art") in view of Mabuchi et al. Of those rejected claims, only claims 1 and 14 are independent claims. Applicant has incorporated the subject matter of claim 3 into claim 1. In the Office Action, the Examiner rejected claims 3-5 under 35 U.S.C. § 103(a) as being unpatentable over admitted prior art in view of Mabuchi et al. and

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Kanai et al. To the extent that the Examiner may assert that rejection against amended claim 1, Applicant respectfully submits that such a rejection would be improper because there is no legally proper suggestion or motivation to modify the admitted prior art in the hypothetical manner proposed by the Examiner. Furthermore, Applicant respectfully traverses the rejection of claim 14 under 35 U.S.C. § 103(a) as being unpatentable over the admitted prior art in view of the Mabuchi et al. reference because there is no legally proper suggestion or motivation to modify the admitted prior art in the hypothetical manner proposed by the Examiner.

Applicant's invention as recited in amended claim 1 is directed to a plasma processing apparatus including a process chamber having an open ceiling and an internal space which can be evacuated, an insulating plate divided into a plurality of regions and airtightly attached to the ceiling of the process chamber, and a mount base placed in the process chamber for mounting thereon a workpiece to be processed. The plasma processing apparatus further includes a planar antenna member placed above the insulating plate and including a microwave radiation hole for transmitting therethrough microwave used for generating plasma, the microwave transmitted through the insulating plate into the process chamber. The plasma processing apparatus also includes gas supply means for supplying a predetermined gas into the process chamber, a heat medium path for flowing a heat medium along a line by which the insulating plate is divided into a plurality of regions, and heat medium temperature control means for controlling the temperature of the heat medium.

Neither the admitted prior art nor the Mabuchi et al. reference discloses or suggests at least a plasma processing apparatus including a process chamber including a heat medium path for flowing a heat medium along a line by which the insulating plate

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is divided into a plurality of regions, and heat medium temperature control means for controlling the temperature of the heat medium.

In the rejection statement of claim 3, the Examiner concedes that neither the admitted prior art nor the Mabuchi et al. reference discloses a "temperature control device (means) for controlling the temperature of the heat medium, [sic] the insulating plate to a predetermined temperature." Office Action at 5. The Examiner asserts, however, that the Kanai et al. reference discloses a "microwave plasma processing apparatus (Figs. 23 and 25) including a block 30e (a microwave window support) supporting a microwave transmitting window 40[a], wherein the support having formed therein a heat medium chamber 170 (heat medium path) for flowing a heat medium therethrough (column 15, line 66 through column 16, line 5), and that "the apparatus further include [sic] a heat medium feeder 173 for varying the temperature of the heat medium, and a heat medium controller 175 which is coupled to the heat medium feeder 173 and a terminal 174 detecting the temperature of the block 30e." Id. The Examiner thereafter concludes that "it would have been obvious . . . to implement the temperature control mechanism as taught by Kanai et al in the apparatus of admitted prior art in view of Mabuchi et al in order to keep the temperature of the window supporting member as a preset constant value." Id. at 5-6. Applicant respectfully disagrees with the Examiner's conclusion because there is no legally proper motivation for modifying the admitted prior art in the hypothetical manner proposed by the Examiner.

"Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references

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themselves or in the knowledge generally available to one of ordinary skill in the art." M.P.E.P. § 2143.01. Applicant respectfully submits that there is no suggestion or motivation, either explicit or implicit, to modify the admitted prior art in the hypothetical manner proposed by the Examiner, as will be explained in more detail below.

Applicant respectfully submits that even if for the sake of argument, one having ordinary skill in the art modified the admitted prior art in the hypothetical manner proposed by the Examiner in view of the Mabuchi et al. reference,[1] a further modification in view of the Kanai et al. reference would not result in Applicant's invention as set forth in amended claim 1.

The Kanai et al. reference discloses a microwave plasma processing apparatus including a vacuum vessel 10 having an electric discharge block 30e grounded through the vacuum vessel 10. See col. 4, line 12; col. 17, lines 17-60. The temperature of the electric discharge block 30e is controlled in order to decrease the amount of plasma polymers deposited on the electric discharge block 30e, to increase the amount of polymers existing in the plasma, and to increase the amount of polymers deposited on a sample to improve a selection ratio. Abstract. In order to control the temperature of the discharge block 30e, a heat medium enters the discharge block 30e via a heat medium feeder 173 provided for varying the temperature of a heat medium. Col. 17, lines 17-26. A heat medium temperature controller 175 is connected to the heat medium feeder 173, and a terminal 174 is provided for detecting the temperature of a discharge block 30e. Id.

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[1] This statement should not be interpreted as an admission by Applicant that one having ordinary skill in the art would make the Examiner's proposed modification to the admitted prior art in view of the Mabuchi et al. reference.

Applicant respectfully notes that the heat medium and the heat medium feeder 173 disclosed in the Kanai et al. reference are not provided in a line by which an insulating plate is divided into a plurality of regions, as recited in Applicant's claim 1. Furthermore, the Mabuchi et al. reference discloses a discharge block (reaction chamber 1) having a heat medium feeder (passage 15) that receives a heat medium (cooling water). Col. 6, lines 18-20. Therefore, even if for the sake of argument, the Mabuchi et al. apparatus were modified in view of the Kanai et al. disclosure, one having ordinary skill in the art would modify the Mabuchi et al. apparatus by incorporating the temperature controller of Kanai et al. to control the cooling water temperature in the Mabuchi et al. passage 15 of the reaction chamber 1, not in a line by which an insulating plate is divided into a plurality of regions, as recited in Applicant's claim 1. Therefore, Applicant respectfully submits that there is no suggestion or motivation in the cited references to modify the admitted prior art in the hypothetical manner proposed by the Examiner.

The Examiner rejected claim 14 under 35 U.S.C. § 103(a) as being unpatentable over the admitted prior art in view of Mabuchi et al. Applicant respectfully traverses that rejection because the admitted prior art and the Mabuchi et al. reference, taken singly or in combination, neither discloses nor suggests all of the subject matter recited in Applicant's claim 14. See M.P.E.P. § 2142.

Applicant's invention as recited in claim 14 is directed to a plasma processing apparatus including a process chamber having an open ceiling and an internal space which can be evacuated, an insulating plate divided into a plurality of regions and airtightly attached to the ceiling of the process chamber, and a mount base placed in the process chamber for mounting thereon a workpiece to be processed. The plasma

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processing apparatus further includes a planar antenna member placed above the insulating plate and including a plurality of microwave radiation holes for transmitting therethrough microwave used for generating plasma, the microwave transmitted through the insulating plate into the process chamber. The plasma processing apparatus also includes gas supply means for supplying a predetermined gas into the process chamber and a support frame member supporting the insulating plate divided into a plurality of regions and including a heat medium path for flowing a heat medium along a line by which the insulating plate is divided into a plurality of regions and along a peripheral part of the insulating plate.

The admitted prior art and the Mabuchi et al. reference fail to disclose or suggest at least a plasma processing apparatus including a support frame member supporting an insulating plate divided into a plurality of regions and including a heat medium path for flowing a heat medium along a line by which the insulating plate is divided into a plurality of regions and along a peripheral part of the insulating plate.

In the rejection statement relating to claim 2, the Examiner asserts that "the arrangement of the gas flowing beams along the peripheral part is considered to have been an obvious modification for further distribution of gas along the perimeter to the substrate." Office Action at 4. Applicant respectfully disagrees with that assertion because there would have been no reason to provide a heat medium path along a peripheral part of the insulating plate of the Mabuchi et al. apparatus.

The Mabuchi et al. reference discloses a plasma processing apparatus including a supporting member 5 having beams 5b for supporting a relatively larger microwave window 4. See, e.g., Abstract. The microwave window 4 is divided by the beams 5b, which reinforce the microwave window 4 against pressure at plasma generation so that

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the apparatus is capable of processing large semiconductor substrates. Id. The beams 5b have internal gas supply passages 42 which communicate with gas inlets 41 for providing a more uniform distribution of plasma. See Figs. 7A and 7B; col. 7, lines 41-56. The beams 5b, while providing more support for larger microwave windows 4, prevent plasma from being generated under the beams 5b, which may result in a non-uniform processing of a sample. Col. 2, line 65 through col. 3, line 12. By supplying the reaction gas into the reaction chamber from the beams 5b themselves, a higher density gas results in more plasma in the vicinity of the beams 5b so that the plasma spreads more uniformly. Col. 3, lines 19-32. Accordingly, it would run counter to the disclosure of the Mabuchi et al. reference to modify its teaching to provide for further distribution of gas along the perimeter of the microwave window 4. Simply stated, the Mabuchi et al. reference as a whole suggests the opposite - that the gas should enter the reaction chamber along the beams 5b in order to enhance uniformity of plasma distribution. Therefore, Applicant respectfully submits that one having ordinary skill in the art would not modify the Mabuchi et al. reference's disclosure to provide for further distribution of gas along the perimeter to the substrate, as recited in Applicant's claim 14.

Furthermore, the other cited references: Yamazaki et al. (U.S. Patent No. 6,059,922); Katayama et al. (U.S. Patent No. 5,545,258); and Ishii (JP-11-339997-A), taken either alone or in combination, fail to overcome the shortcomings of the admitted prior art, the Mabuchi et al. reference, and the Kanai et al. reference.

Accordingly, Applicant respectfully submits that amended claim 1 and claim 14 are allowable. Furthermore, Applicant submits that claims 2 and 4-13, and claim 15, are

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allowable by virtue of their dependency on claims 1 and 14, respectively, as well by their additional recitations of novel and non-obvious subject matter.

Applicant respectfully requests reconsideration and reexamination of this application and the timely allowance of the pending claims.

If the Examiner believes that a telephone conversation might advance prosecution, the Examiner is cordially invited to call Applicant's representative at 571-203-2739.

Applicant respectfully submits that the Office Action contains numerous assertions relating to the related art and the claims. Regardless of whether those assertions are addressed specifically herein, Applicant respectfully declines to automatically subscribe to them.

Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account No. 6-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
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Dated: October 9, 2003

By: Reg. No. 48,216
for David W. Hill
Reg. No. 28,220

Attachments: two annotated drawing sheets
two replacement drawing sheets

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